

# UINTAH BASIN AIR QUALITY RESEARCH PROJECT

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## 2019 REPORT

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**UtahStateUniversity**

BINGHAM ENTREPRENEURSHIP  
& ENERGY RESEARCH CENTER

# Our Research Team



Colleen Jones, PhD  
Ecology and Environmental  
Chemistry



Tyler Elgiar  
Student Researcher



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Air Quality Modeling



Trang Tran, PhD  
Air Quality Modeling



Marc Mansfield, PhD  
Modeling and Analysis



Trevor O'Neil  
Field and Laboratory  
Measurements



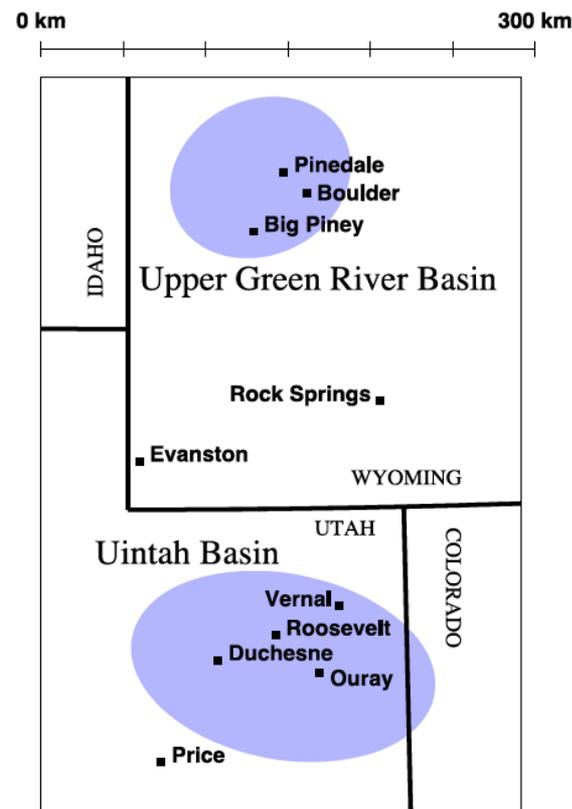
Makenzie Holmes  
Student Researcher



Seth Lyman, PhD  
Measurement and Analysis,  
Director

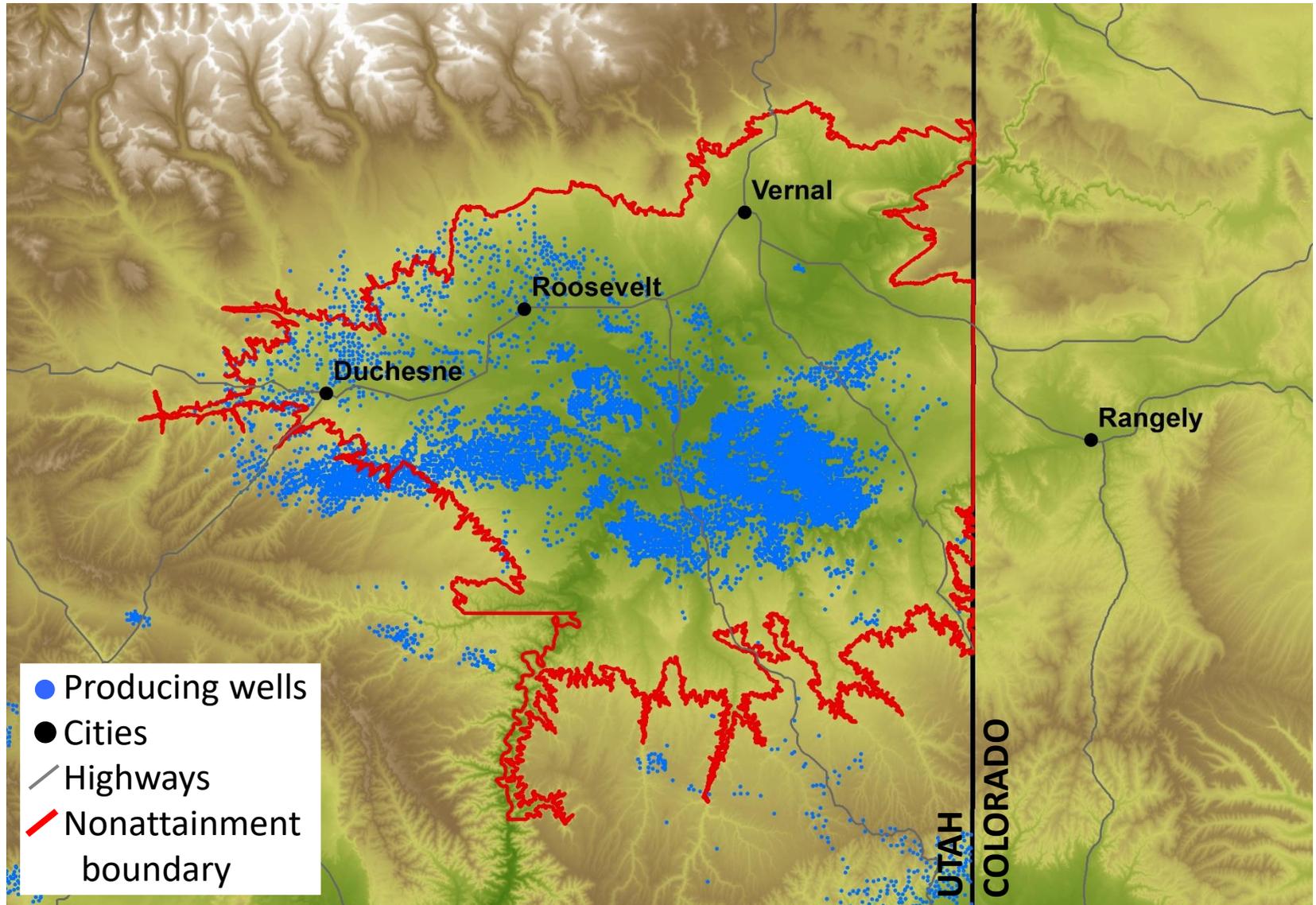
# Wintertime Ozone is Scientifically Unique and Uniquely Tied to the Uintah Basin's Economy

- Wintertime ozone only occurs in two places in the world, only been known to science for ~10 years
- Majority of winter ozone precursors are emitted from local oil and gas industry, which accounts for about 60% of the Uintah Basin economy
- Winter ozone threatens both human and economic health
  - The oil and gas industry provides hundreds of millions of dollars in annual revenue to the state<sup>1</sup>



<sup>1</sup> <https://trustlands.utah.gov/business-groups/oil-gas/learn-about-utah-oil-and-gas/>

# The Uinta Basin Ozone Nonattainment Area Will Change from Marginal to Moderate in 2021



# Computer Models Are Required to be Used in Development of Emission Reduction Plans

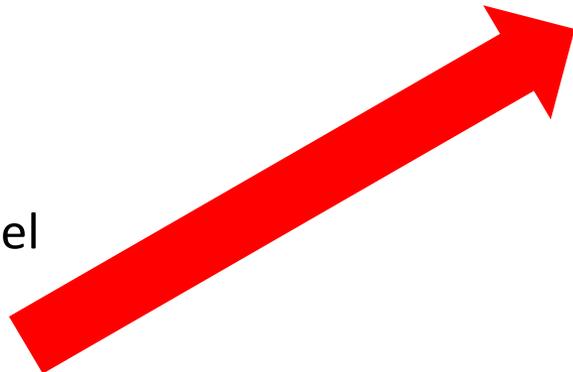
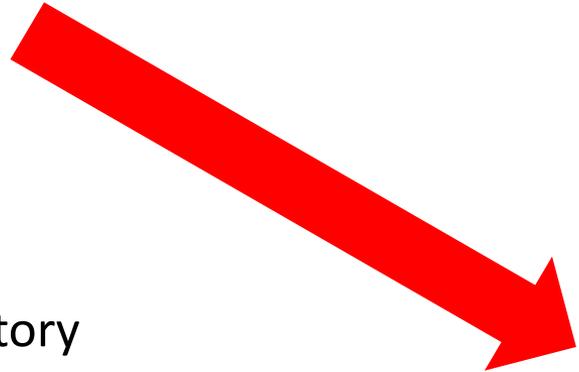
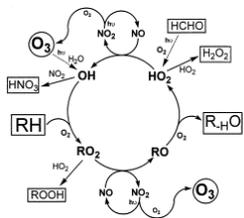
Meteorological model



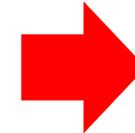
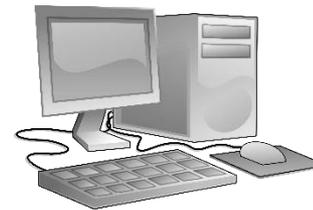
Emissions inventory and model



Atmospheric chemistry model



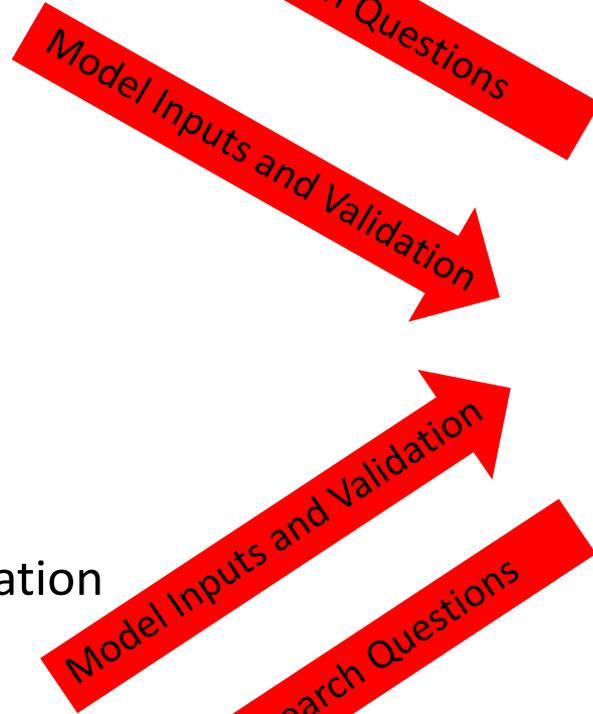
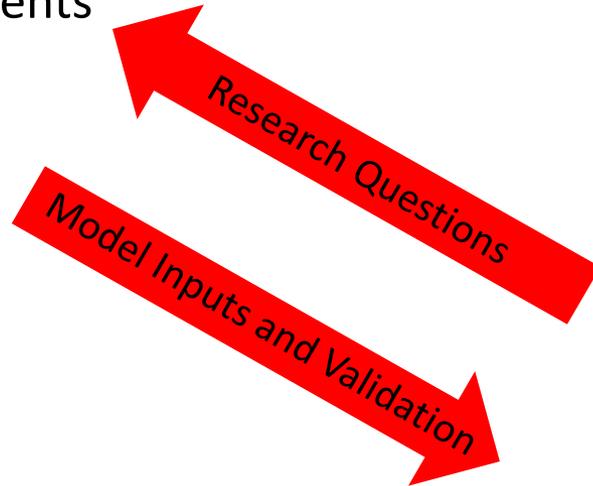
Computer Simulations



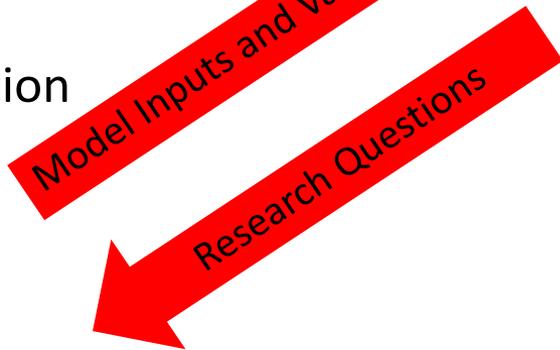
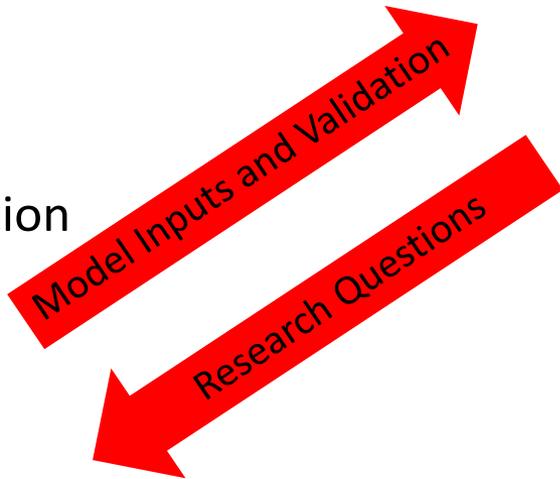
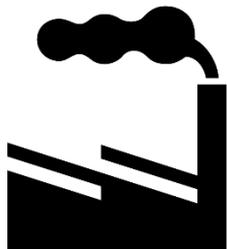
Emissions Reduction Plans

# Our Research is Improving the Ability To Model Winter Ozone

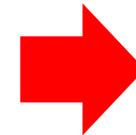
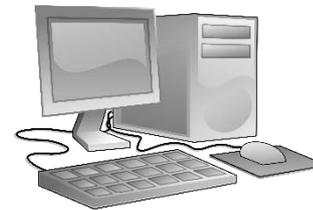
Ambient Air Measurements



Emissions Characterization

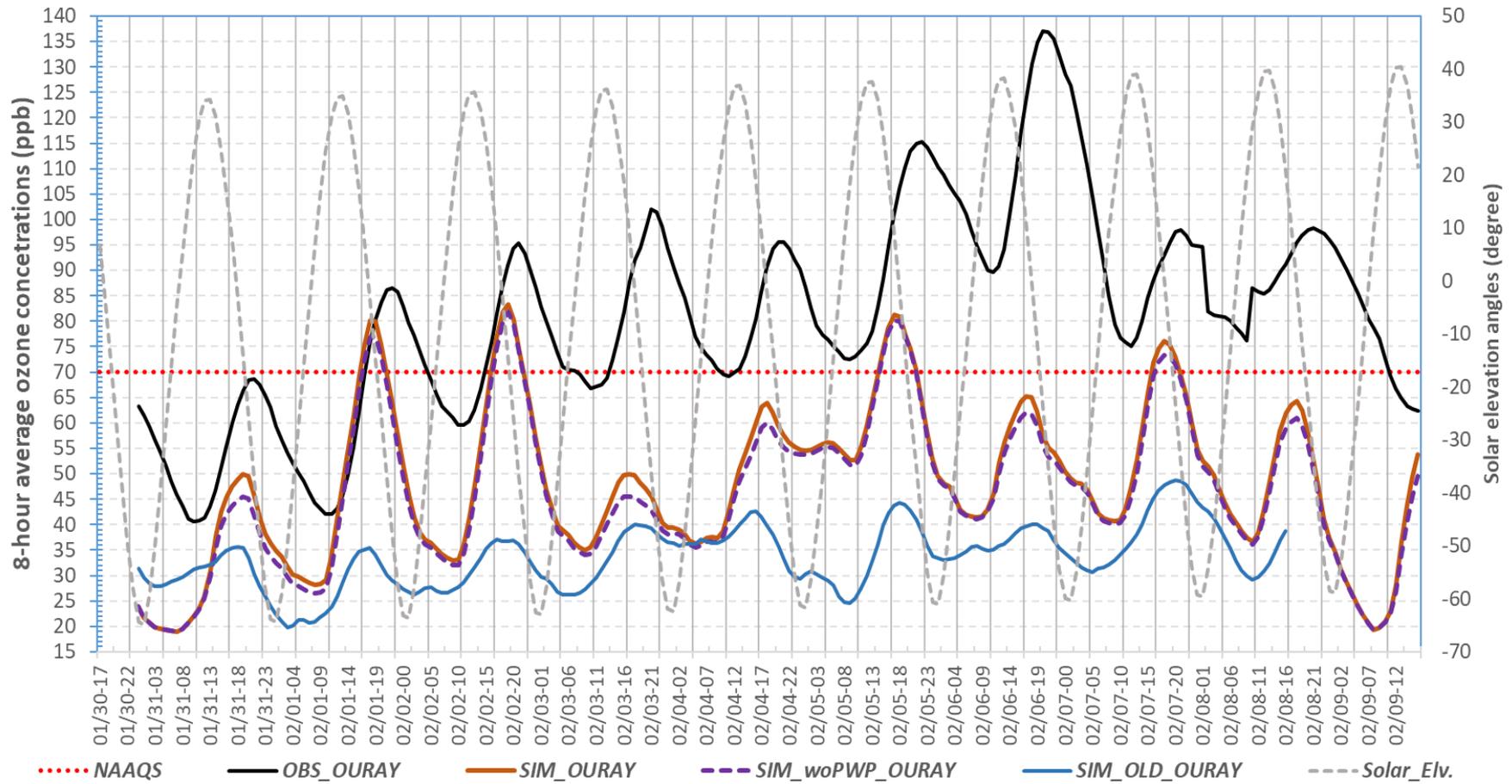


Computer Simulations

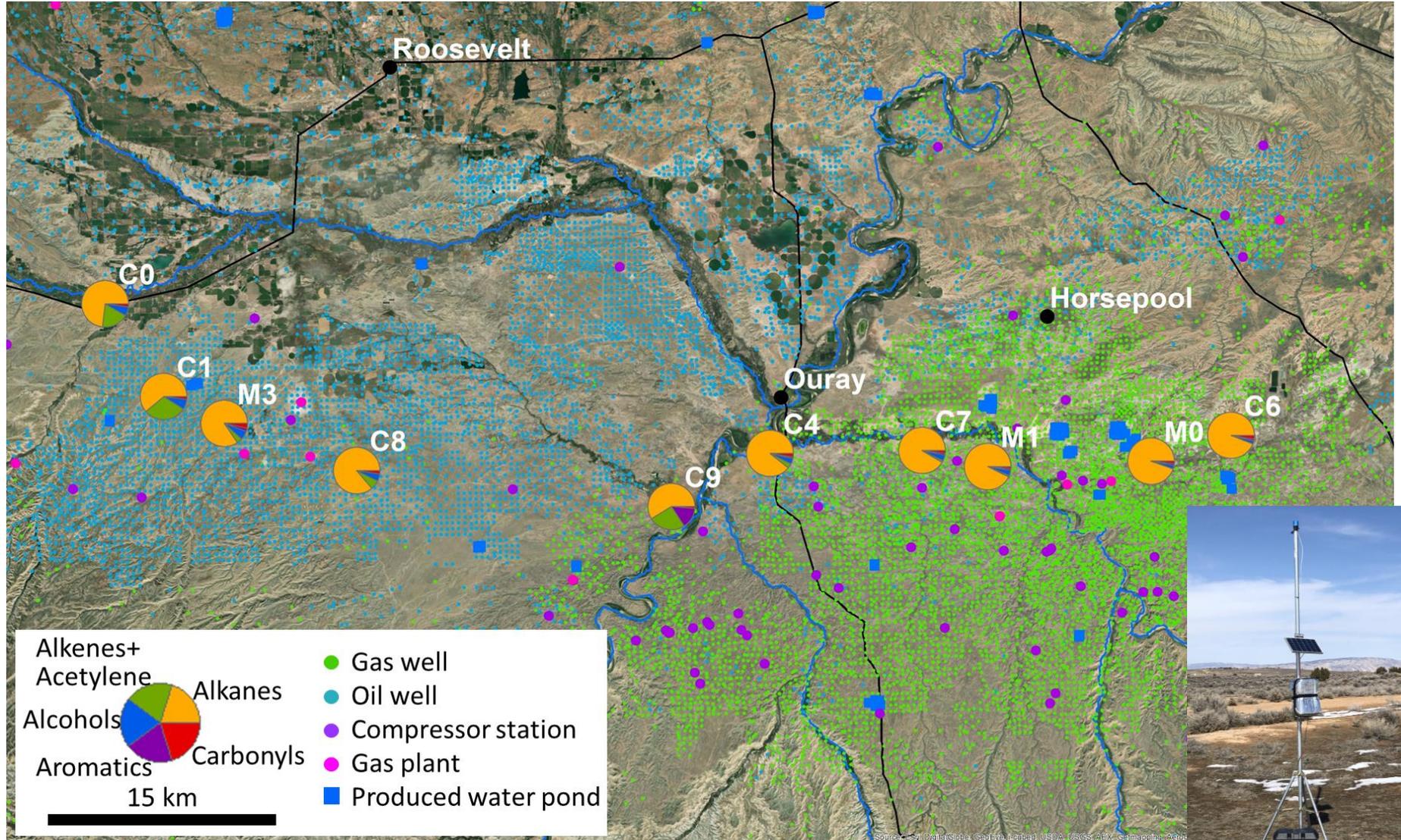


Emissions Reduction Plans

# Our Research is Improving the Ability To Model Winter Ozone



# Measuring Pollutant Concentrations Around the Uinta Basin

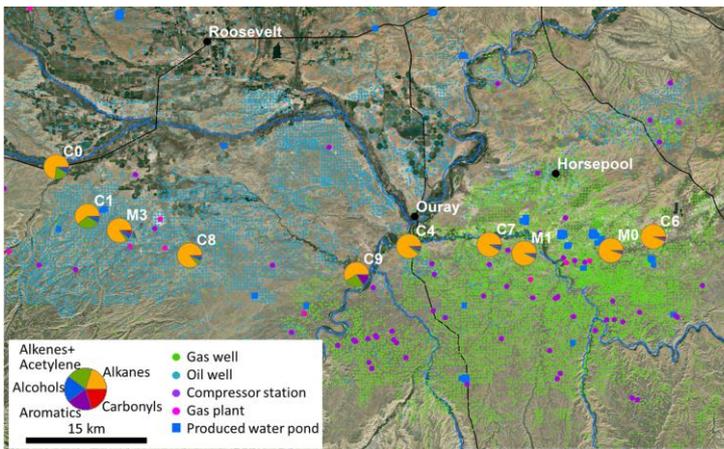


# New Measurements are Being Used to Verify the Accuracy of Model Output

Output from computer simulations



Comparison of computer output against ambient measurements



Feedback about needed changes to modeled emissions and chemistry

A second phase of this project has received funding from Utah DAQ

# A Stakeholder Group Guides Our Research and Ensures It is Relevant and Useful

- Stakeholder committee includes:
  - Technical experts from oil and gas industry
  - TriCounty Health
  - Local government leaders
  - State and federal regulatory agencies
- The committee:
  - Reviews our annual research plan and provides suggestions for improvement
  - Reviews and comments on our research output
- A larger group of stakeholders have asked for more frequent research updates. We are developing a plan to accommodate that request.

# We Have Made Progress But Work Remains to be Done

- Upcoming requirement for regulatory modeling of winter ozone justifies a push to do all we can now to improve models
  - Combination of measurements and measurement-based model improvements is needed



# Thank You



Additional funding provided by:

- Uintah Impact Mitigation Special Service District
  - Utah Division of Air Quality
  - Ute Indian Tribe
  - Bureau of Land Management
  - U.S. Department of Energy
  - Environmental Protection Agency
  - National Science Foundation
- Data and site access provided by many local energy companies

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